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ARTIFICIAL INSEMINATION OF CATTLE

A Review of the Work of the Reading Cattle Breeding Centre

October 1st, 1944, to September 30th, 1948

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Since the opening of the first centre for the artificial insemination of cattle at Kimble, Buckinghamshire, in August, 1942, the development of artificial insemination has been even more rapid than most people had anticipated, and in the year ended March 31st, 1949, 387,763 cows and heifers were inseminated from cattle breeding centres in England and Wales (Milk Marketing Board Report, 1948-49), which represents approximately 16·8 per cent. of the cows in the country. The figures from U.S.A. compiled by the Bureau of Dairy Industry, U.S.D.A., are even more striking, revealing that as at January 1st, 1949, 2,412,160 cows were enrolled in 1,263 artificial insemination associations in that country.

The Milk Marketing Board reports give an overall picture of artificial insemination in England and Wales, but it would seem that a closer look at an individual centre would be of considerable value, particularly as at present there is much uninformed comment and criticism of artificial insemination in Britain.

The following is a brief review of the work done by the Reading Cattle Breeding Centre, and for convenience it will be divided into two parts, namely, Part A dealing with routine insemination work and Part B dealing with investigations and observations.

PART A

1. DEVELOPMENT

The Ministry of Agriculture and Fisheries sponsored the establishment of two centres at Reading and Cambridge for the purpose of studying the field application of artificial insemination to the breeding of cattle in Great Britain. The Reading centre was set up in February, 1943, under the direction of the National Institute for Research in Dairying. In October, 1945, the original purpose of the centre having been fulfilled, the direction was taken over by the Ministry of Agriculture and Fisheries, who decided to continue it as a research centre, while at the same time giving a service to an area of the country similar to that given by a commercial centre.

In November, 1943, the first sub-centre in England was opened at Guildford and later, in October, 1946, two further sub-centres were established at Bloxham, N. Oxfordshire, and Faringdon, N.W. Berkshire, all as extensions from the Reading centre. The organisation now provides a service for the greater part of Berkshire, Oxfordshire and Surrey, and smaller parts of Hampshire, Buckinghamshire, Wiltshire, Gloucestershire, Warwickshire and Northamptonshire. This type of organisation, *i.e.*, a main centre with one or more large sub-centres, has been generally adopted in Great Britain.

The Reading centre gives a service for the Shorthorn, Guernsey, Friesian, Hereford, Jersey and Ayrshire breeds, the semen for the last two being imported from other centres. At the same time, semen from bulls of the breeds kept at Reading is regularly supplied to other artificial insemination organisations. In accordance with national policy, Hereford bulls were obtained in the autumn of 1947 to be used under the Ministry's Free Beef Scheme. Although reference is made to this scheme, inseminations carried out under it are not included in any of the investigations.

2. NUMBER OF COWS INSEMINATED

TABLE I

TOTAL NUMBER OF COWS INSEMINATED

Year ended	Dairy scheme	Beef scheme
30.9.43	346	—
30.9.44	2,832	—
30.9.45	3,247	—
30.9.46	5,467	—
30.9.47	10,807	—
30.9.48	17,245	737
	39,944	737

TABLE II

DETAILS OF INSEMINATIONS CARRIED OUT YEAR ENDED 30.9.48

Area	Dairy scheme		Beef scheme	
	First services	Repeat services	First services	Repeat services
Reading	6,293	4,675	65	43
Guildford	3,910	3,627	5	2
Bloxham	3,316	2,739	537	291
Buckland	3,726	2,553	130	61
	17,245	13,594	737	397

In connection with Table II it is interesting to note that, although they have been in existence only since October, 1946, the sub-centres at Bloxham and Buckland already equal Guildford and are rapidly gaining on Reading in the total number of cows inseminated. This indicates that artificial insemination is now an accepted method of breeding cattle. The opening of these sub-centres accounts for the great increase in the number of cows served in 1947 and 1948 as compared with earlier years.

The number of cows inseminated at Reading and Guildford during the year ended September 30th, 1948, represents 19·2 per cent. and 21·4 per cent. of the cows and bulling heifers in each respective area. This calculation was made from figures supplied by the County Agricultural Executive Committees.

3. Membership

The most reliable information on membership is the number of farmers using the service and the figures given below were compiled from the ledgers.

Table III

Area	1947	1948	
		Dairy	Beef
Reading ...	592	828	10
Guildford ...	454	615	3
Buckland ...	221	522	41
Bloxham ...	259	535	159
	1,526	2,500	213

4. Conception Rates

In accordance with the usual practice in Great Britain, conception rates are given as the percentage of first inseminations not reported to have returned to service within a given period. In this report the period used is 16 weeks from the date of insemination and this is very similar to the three months' estimation normally used by other centres. Further information on methods of estimating conception rates is given in Part B, para. 1.

Table IV shows that during the years 1945 and 1946 good results were obtained at Reading and Guildford, and that results in both areas were approximately equal. This experience led to the opening of Bloxham and Buckland sub-centres. However, in 1947, the sub-centres showed a slight reduction in conception rates as compared with the main centre at Reading. The poorer results occurred during the summer months and since this difference was found only at the sub-centres, the method of transport was suspected and investigated.

Tables IV and V also show that there was an all-round reduction in conception rate in 1948 and that this occurred in the second half of the year. The cause of the reduced fertility has been the subject of much investigation, and although minor improvements have been made at the centre and sub-centres, the basic cause is still unknown. It should be noted that this occurred while in general, the same bulls, staff and methods were employed. It is known that this experience is not peculiar to the Reading centre.

Table VI

Breed Conception Rates, 1.10.47 – 30.9.48

Breed	Number of firsts	Conception rate %
Shorthorn	6,805	58·4
Guernsey	5,203	57·5
Friesian	3,646	57·3
Jersey	1,575	52·3
Hereford	737	62·4

The figures shown in Table VI indicate that there is no breed difference in conception rate between the bulls kept at Reading. The slightly lower results in respect of the Jersey breed, the semen for which is imported from a neighbouring centre, may be attributable to transport difficulties or to temporary difficulties with the Jersey bulls at that centre.

The higher figure obtained in the Free Beef Scheme may be due to the less reliable reporting of returned services, or to the individual high fertility of the one Hereford bull responsible for the production of most of the semen.

A breed difference in fertility in Great Britain would appear to be most unlikely and differences found at artificial insemination centres are more likely to be related to the individual bulls in use.

Table IV

Conception Rates from 1.10.44–30.9.48 (Dairy Scheme)

Year ended	Reading		Guildford		Bloxham		Buckland		Totals	
	Firsts	%	Firsts	%	Firsts	%	Firsts	%	Firsts	%
30.9.45	1,982	63·4	1,265	67·4					3,247	64·9
30.9.46	3,404	65·7	2,063	65·0					5,467	65·4
30.9.47	4,593	66·5	2,938	60·6	1,679	58·7	1,597	63·4	10,807	63·0
30.9.48	6,293	60 3	3,910	52·7	3,316	54·0	3,726	60·1	17,245	57·3
	16,272	63·6	10,176	59·1	4,995	55·9	5,323	61·2	36,766	60·9

Table V

Analysis of Conception Rates 1.10.47–30.9.48 (Dairy Scheme)

Quarter	Reading		Guildford		Bloxham		Buckland		Total	
	Firsts	%	Firsts	%	Firsts	%	Firsts	%	Firsts	%
Oct./Dec. ...	1,647	66·9	921	61·2	888	56·8	931	63·7	4,387	63·0
Jan./Mar. ...	1,905	62·4	1,142	58·9	1,185	56·3	1,197	65·7	5,429	61·0
April/June ...	1,715	53·8	1,077	48·1	747	50·6	946	54·3	4,485	52·0
July/Sept. ...	1,026	56·8	770	39·9	496	48·8	652	52·9	2,944	50·2
	6,293	60·3	3,910	52·7	3,316	54·0	3,726	60·1	17,245	57·3

5. Extent to which Breeds were used in year ended September 30th, 1948.

Table VII

Breed	All centres %	Reading %	Guildford %	Bloxham %	Buckland %
Shorthorn ...	37·6	40·5	36·0	39·7	33·7
Guernsey ...	28·7	35·4	40·7	11·9	23·5
Friesian ...	20·2	13·4	12·7	28·4	31·4
Jersey	8·6	8·7	10·6	6·1	8·0
Ayrshire ...	0·7	1·0	*	*	*
Hereford ...	4·2	1·0	*	13·9	3·4

* = Numbers negligible.

It will be noted that the relative use of each breed varied from area to area and was governed by the farming practices in these areas. There was no obvious misuse of the free beef scheme, although a relatively large number of inseminations under the beef scheme were carried out in the Bloxham area. This will be readily understood when it is remembered that before the war there were several Hereford bulls placed in this area under the premium bull schme.

6. Semen sent to Other Artificial Insemination Centres

Table VIII

Number of Inseminations and Conception Rates, 1.10.47 – 30.9.48

Breed	Number of firsts	Number of repeats	Conception rate %
Shorthorn ...	675	557	56·1
Guernsey ...	1,270	636	56·1
Friesian ...	1,100	863	54·3
All breeds ...	3,045	2,056	55·4

The results in Table 8 indicate that it is a practical procedure to interchange semen between centres as the conception rate of 55·4 per cent. compares reasonably well with 57·3 per cent. obtained at Reading using the same semen.

7. Number of Cows inseminated per Bull October 1st, 1947, to September 30th, 1948.

It was found that each bull averaged 1,497 first services and 1,124 repeat services, making a total of 2,621 inseminations in the year. This average was based on the number of months each bull was on the centre. The three bulls that were used most frequently were each responsible for 3,349, 2,778, and 2,135 first services, respectively. The average number of cows inseminated per bull is shown as follows:—

Table IX

Year ended	Number of first inseminations
30.9.44	318
30.9.45	320
30.9.46	483
30.9.47	933
30.9.48	1,497

8. Reported Calvings during year ended September 30th, 1948.

Table X

Centre	Live heifers	Live bulls	Dead heifers	Dead bulls	Abortions	Sold in calf	Died in calf	Not classified
Reading	1,318	1,229	30	24	60	172	21	44
Guildford	895	864	20	14	25	84	16	7
Bloxham	590	672	9	4	33	96	17	7
Buckland	666	698	10	3	37	48	61	26
	3,469	3,463	69	45	155	400	115	84

The figures in this table have been collected by officers visiting the farms and can therefore be considered as accurate. It is of interest to note the remarkable approximation in the number of live heifer and bull calves. It will be observed that 2·1 per cent. of the pregnancies resulted in abortion and 1·6 per cent. in the birth of dead calves, *i.e.*, a calving loss of 3·7 per cent. of the total pregnancies. This will include all forms of late abortion and calving accidents. It would appear from this, that the loss from *Abortus* infection must be extremely low. This could mean that the incidence of contagious abortion is much lower than generally believed, or that the very widespread use of Strain 19 vaccine has reduced the incidence of brucellosis to negligible proportions in the areas concerned. It is probable that the latter explanation is the correct one. At the Ilminster centre, 2·8 per cent. pregnancies resulted in abortion (Clarke, 1949), which is comparable with the findings in the Reading area.

9. General Comments

(*a*) *Number of Cows per Inseminator (October 1st, 1947, to September 30th, 1948.*—The average number of cows inseminated by each operator who worked the full 12 months was 1,347. This figure indicates only part of his work, as each man also carries out a proportional number of repeat services. It is possible that this number of cows must be nearing the reasonable maximum number per year per man for the Reading centre, as in some cases operators had to go for considerable periods without leave. Obviously, the number of inseminations per man will vary considerably with local conditions, *e.g.*, density of cattle population, transport difficulties, etc. However, if numbers become the sole criterion of an inseminator's work, efficiency will undoubtedly suffer and a lowered conception rate will follow.

(*b*) *Mileage per Cow.*—During the year October 1st, 1947, to September 30th, 1948, an average of 19 miles was travelled in respect of each cow, or 10 miles an insemination. The mileage was higher than had been anticipated, because the two new sub-centres were in an early stage of development and a large mileage was necessary to inseminate a comparatively small number of cows. There should be a considerable reduction in the mileage per cow during the coming year.

(*c*) *Bulls.*—Available data show that there are considerable variations in the working capacity and fertility of individual bulls. The frequency with which a bull can be used depends entirely on the individual animal, but experience at the centre would suggest that even mature bulls do not respond well to being worked three times per week, although some bulls do exceedingly well when worked twice per week. The optimum would appear to be once every

five to seven days for mature animals and once every seven to ten days for younger animals.

With regard to fertility bulls can be classified into two groups: (*a*) consistent producers of highly fertile semen and (*b*) producers of semen of variable quality. Several months usually elapse before it can be decided into which group a bull falls. If this is correct, it would appear that on the average two bulls would have to be bought to obtain one first-class worker, and this may be of importance to a centre with limited accommodation. Therefore, until such time as more information on bull fertility is available, the only policy is to cull bulls of moderate fertility as soon as they are definitely recognised.

(*d*) *Staff*.—During 1948, the staff consisted of three veterinary officers, 14 lay inseminators, two field officers, two stockmen, one laboratory attendant and five clerks.

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PART B

1. Conception Rates

(*a*) *Estimation of True Conception Rate*.—It has become the practice to assess the efficiency of a centre on conception rate, and this can be assessed in various ways. The usual method is to calculate the percentage of first inseminations not reported to have returned to service within a given period, generally three months, in Great Britain. This is based on the assumption that a herd owner, having paid a fee covering the first and two repeat services, will take advantage of at least one repeat service, should the original be ineffective. It is assumed that a conception rate based on first services will give an indication of the results to be expected from subsequent services.

Although it is usual to use such methods of estimating conception rates, the relationship of these estimations to actual pregnancies is not clearly understood and two attempts have been made to clarify this matter.

The first attempt was made by carrying out pregnancy diagnosis on all cows inseminated between December 1st, 1944, and November 30th, 1945. Of the 2,054 cows involved, it was possible to examine only 90 per cent., the remainder having been sold or removed to another district. These unknown animals are a selected group in that they were inseminated once, were not reported as having returned to service and were not examined for pregnancy. Therefore, it can be assumed that they would have yielded results at least as good as those examined. If these unknown animals are disregarded in the calculation of results, it is found that 57·5 per cent. of the first inseminations resulted in pregnancy.

Further investigations on the same question were carried out on the cows inseminated in the Reading area during the year ended December 31st, 1946. In this instance, 3,716 cows were involved and the results were based on calvings. Similarly, the outcome of 11·1 per cent. first inseminations was unknown. Disregarding the unknowns, the percentage calving to the first insemination was 52·2 per cent., but the true figure is probably slightly higher, since the majority of the unknowns were reported to have been sold in calf.

(*b*) *Comparison of Conception Rates estimated at Different Periods*.—At the Reading centre the custom has been to estimate the number of first inseminations not reported as having turned to service at periods of four, eight and 16 weeks from the date of insemination (Table XI). Most centres make their estimation on a calendar monthly basis, *i.e.*, the number of non-returns for the month calculated at the end of the three succeeding months (Table XII).

Table XI

Period	Number of first services	Percentage not reported to have returned at			Probable % conc. rate
		4 weeks	8 weeks	16 weeks	
1944/5	2,046	82·9	73·3	66·1	57·5
1946	3,828	81·0	71·0	64·3	52·2

Table XII

Period	Number of first services	Percentage not reported to have returned at				Probable % conc. rate
		1 month	2 months (approx.)	3 months	9 months	
1944/5	2,046	77·2	69·0	66·1	62·7	57·5
1946	3,828	74·9	68·3	65·3	58·6	52·2

These tables are self-explanatory, but attention is drawn to the difference between the estimated conception rate at three months and the probable conception rate.

Conception rates assessed by the above methods give only an indication of the efficiency of the centre and not a true picture of the fertility of the cattle in the area, *e.g.*, no account is taken of anoestrus (absence of heat), which is probably the most serious cause of breeding delay. In Table XI it is interesting to note that over 80 per cent. have not been reported as having returned to service at 28 days, although this covers the period of the normal oestrous cycle.

Results from First and Repeat Services.—If all the unknown animals are disregarded in the 1946 investigation, the conception rate on the first three inseminations is as follows:—

Table XIII

	Number of inseminations	Percentage pregnant
First services	3,296	52·4
Second services	1,105	47·0
Third services	469	40·1

The unknown animals make it difficult to arrive at a final result on all inseminations, but from the study of the cows inseminated in 1946, it would appear that between 85 per cent. and 90 per cent. calved within three inseminations.

The above results are in agreement with those given by Clarke (1949) for the Ilminster centre, where 62·2 per cent. of 19,124 first inseminations were not reported as returning within three months and resulted in a calving percentage of 53·4 per cent., thus showing a difference of 9·2 per cent. between the estimated conception rate and calving rate, which is very similar to that given above for Reading. Following the initial three-month conception rate of 62·6 per cent., a calving percentage of 86·4 per cent. was obtained in respect of all the cows inseminated, which percentage also is in close agreement with the estimate given for Reading.

There can be little doubt that conception rates calculated on the basis of non-returns to the first insemination give an accurate indication of the efficiency of an artificial insemination centre. Conception rates so estimated will allow of any comparison being made within the same organisation. Difficulty in comparing the conception rates of different centres by this method can easily be foreseen, as differences could occur on individual centres as a result of different methods of working and local differences in farming practice.

2. Dilution of Semen

After a short period, when undiluted semen was used, the egg yolk citrate diluent was introduced and semen was diluted at the rate of 1 : 4. This rate was gradually increased and by 1946 a dilution of 1 : 20 had been commonly used. As shown in Part A, Table III, results were not affected by these increases.

Following reports from U.S.A. (Salisbury, Beck, Cupps and Elliott (1943) and Salisbury, Elliott and VanDemark (1945)), observations were made during the years 1946-47 on dilution rates of 1 : 50 and 1 : 100 and these resulted in a full trial being carried out.

In order to avoid taking risks with the centre's conception rate, during the trial period only bulls with a history of high fertility were used, and from these bulls only semen of very high initial motility and high density (over 1,000 million spermatozoa per c.c.). The investigation was based on a comparison between dilution rates of 1 : 20 and 1 : 50 and each sample of semen was divided to provide approximately equal quantities of each dilution. Arrangements were made to ensure that both dilutions were used at random. Results were as shown in the following tables:—

Table XIV

Area	1 : 20 dilution		1 : 50 dilution	
	Number of firsts	Conc. rate %	Number of firsts	Conc. rate %
Reading	1,201	63·6	987	62·8
Guildford	767	62·5	476	59·2
Bloxham	519	57·6	236	61·0
Buckland	792	64·8	862	63·8
	3,279	62·67	2,561	62·67

Table XV

Time of use	1 : 20 dilution		1 : 50 dilution	
	Number of firsts	Conc. rate %	Number of firsts	Conc. rate %
Second day ...	1,409	67·1	1,173	65·7
Third day	1,336	59·7	1,022	63·5
Fourth day ...	534	58·4	366	56·3
	3,279	62·67	2,561	62·67

From the foregoing tables it is evident that there is no difference between a dilution rate of 1 : 20 and 1 : 50, provided good quality semen from highly fertile bulls is used. During the investigation operators followed their usual practice and used stored semen at their discretion, judged by microscopical examination. This led to a discrimination against the higher dilution, as such semen on examination appears inferior to that of a lower dilution. It is notable, however, that at the Buckland sub-centre, where more of the higher dilution was used, the results were extremely good.

The overall results on storage show practically no difference between the dilutions, despite the inconsistency shown on the third day. The drop in conception rate from the second to fourth day was similar in both cases.

As a result of these observations it is difficult to speculate on the results that might be obtained using semen from bulls of moderate fertility in high dilution. However, it is worth noting that one bull whose semen was reasonably good on initial examination produced a very low conception rate at a dilution of 1 : 20. When the dilution of this bull's semen was reduced to a rate of 1 : 5, there was no noticeable improvement in his fertility.

3. Storage of Semen in Relation to Conception Rate

The following tables show the differences in conception rate obtained by using semen after storage:—

Table XVI

(Period 1.12.44 to 30.6.46)

Time of use	Number of first services	Conc. rate %	Difference %
First day	2,130	67·1	0·0
Second day	2,825	67·5	— 0·4
Third day	1,488	63·2	— 3·9
Fourth day	303	59·7	— 7·4

Table XVI shows that there is a decline in fertility of stored semen from the first to the fourth day of use. This drop in fertility is similar to that shown in Table XV.

Table XVII

(Period 1.9.48 to 30.4.49)

Time of use	Number of first services	Conc. rate %	Difference %
First day	6,247	60·6	0·0
Second day	5,840	57·6	— 3·0
Third day	1,185	47·9	— 12·7

From Table XVII it is observed that there is a more rapid drop in fertility from the first to second day and from the second to third day in the period 1948-49 than in 1944-46. These results would suggest that there was some change in the quality of the semen used, although the possibility of some unobserved change in technique must not be overlooked.

During 1948-49 the centre was carrying a greater proportion of bulls of moderate fertility than in 1944-46. In the former period 50 per cent. of the bulls were of high fertility and the remainder moderate, whereas in the latter period 90 per cent. were of high fertility.

During the investigation into dilution outlined in paragraph 3 an opportunity was afforded for observing the relationship between semen quality and fertility after storage. In this period, semen was used in three main classifications as follows:—

Class A.—Semen of good initial motility and high density from bulls with a history of high fertility.

Class B.—Semen from the same bulls as in Class A, but of a lower density (less than 1,000 million per c.c.).

Class C.—Semen from bulls of moderate fertility. These

bulls were inconsistent in the quality of semen they produced, but the samples used were considered to be up to the normal standard for artificial insemination.

Fifty per cent. of the bulls on the centre were in Classes A and B and the remainder in Class C.

The standard rate of dilution of 1 : 20 was used in Classes B and C. Class A samples were divided as described in paragraph 2 and diluted 1 : 20 and 1 : 50. It will be noticed from Tables XIV and XV that this did not affect conception rates.

The results were as shown in the following table:—

TABLE XVIII

	Group A			Group B			Group C		
	Number of firsts	Conc. rate %	Difference %	Number of firsts	Conc. rate %	Difference %	Number of firsts	Conc. rate %	Difference %
Second day	2,582	66·1	0·0	532	62·6	0·0	963	62·1	0·0
Third day	2,358	61·3	— 4·1	409	58·2	— 4·4	830	46·3	— 15·8
Fourth day	900	57·6	— 8·2	171	54·4	— 8·2	381	36·7	— 25·4
Totals	5,840	62·7		1,112	59·7		2,174	51·8	

The striking feature concerning Table XVIII is that the conception rates correspond to the initial quality of the semen. Class A shows the highest total conception rate and a moderate drop on storage. Class B—semen from the same bulls—shows a slight decrease in total fertility, but a similar drop on storage. This might be expected from the slightly inferior quality of the semen. Class C shows a considerable drop in total fertility as compared with Classes A and B, and although the conception rate is similar to that in Classes A and B on the first day of use, there is a rapid deterioration on the third and fourth day after collection. This would indicate that the differences in the fertility of bulls becomes emphasised after storage of the semen and is associated with the viability of the spermatozoa produced.

4. Time of Insemination

The relationship between time of insemination and conception rate has so often been raised that it was decided to investigate this question. The exact time of the onset of heat was not definitely known, but in this investigation the following terms were used.

Time of Onset of Heat

AM indicates animal seen bulling in the morning, in which case oestrus may have commenced some time during the night.

PM indicates animal seen bulling after 1 p.m.

Time of Insemination

AM indicates insemination carried out between 10 a.m. and 2 p.m.

PM indicates insemination carried out between 2 p.m. and 6 p.m.

Table XIX indicates that there is no appreciable difference in conception rate between the three main times of insemination, i.e., groups 2, 3 and 4 (the times recommended for service by most artificial insemination centres); the figures in Groups 5 and 6 indicate that fertility will probably drop if inseminations are performed late, but there is no indication that inseminations are likely to be carried out too early. There is evidence that service very early in oestrus results in a lowered fertility, but this is unlikely to occur in artificial insemination owing to the inevitable delay between a cow being observed in oestrus and inseminated.

TABLE XIX

IN THIS TABLE CONCEPTION RATES ARE GIVEN AS THE NUMBER OF COWS NOT REPORTED AS RETURNED TO SERVICE WITHIN NINE MONTHS

Group	Reported in oestrus	Time of service	Number of of first inseminations	Conc. rate %
1	P.M.	Same P.M.	208	65·9
2	A.M.	Same A.M.	5,539	60·6
3	A.M.	Same P.M.	4,573	57·6
4	P.M.	Next A.M.	2,072	58·6
5	P.M.	Next P.M.	285	55·8
6	A.M.	Next A.M.	65	47·7
			12,742	59·1

5. Semen Diluents

(*a*) *Comparison between Yolk Citrate and Yolk Phosphate Diluents.*—No planned investigations were made into semen diluents until 1949, but in 1946 an opportunity was afforded to compare the usual phosphate and citrate diluents. These diluents were supplied by the same drug house, and the formulae were as follows:—

Citrate diluent ... 3·92 per cent. sodium citrate adjusted to *p*H 6·7.

Phosphate diluent ... 2·0 per cent. sodium phosphate.
0·2 per cent. pot. dihydrogen phosphate *p*H 7·4.

In each case, the diluting fluid was prepared by adding an equal quantity of egg yolk. The results are shown in the following table:—

TABLE XX

Diluent	Period of use	Number of first services	Conception rates %
Yolk citrate	11.5.46–11.7.46	994	64·5
Yolk phosphate ...	12.7.46–12.9.46	594	59·6
Yolk citrate	13.9.46–13.11.46	671	66·3

The above observations would suggest that the citrate diluent is superior to the phosphate, and, although judgment should be reserved, it would seem certain that the citrate is at least not inferior to the phosphate as has been claimed by some workers. These figures have the disadvantage that they are based on comparatively small numbers and that the diluents were not used simultaneously, thereby not giving an exact comparison. In later work, steps have been taken to avoid these criticisms.

Apart from the short period shown in the above table,

citrate diluent has always been used at the Reading centre as the transparency of the egg-yolk citrate makes for easier examination of diluted semen.

(*b*) *Addition of Sulphanilamide to Semen Diluents.*—The favourable reports on the increased fertility (Salisbury and Knott, 1947) resulting from the addition of sulphanilamide to the usual semen diluents, suggested that a field trial should be carried out to confirm these reports before introducing sulphanilamide into the diluent as a routine practice at the centre. The improvement resulting from the addition of sulphanilamide was believed to be due to the effective control of bacterial growth in the semen and the depressant effect on the oxygen consumption of spermatozoa which improved livability on storage.

The trial diluent, prepared as described by Salisbury and Bratton (1948), *i.e.*, 0·6 gramme sulphanilamide per 100 ml., was added directly to the sodium citrate buffer, which gave a level of 300 mg. per 100 ml. when mixed with equal parts of egg-yolk. The usual citrate diluent (3·6 per cent. sodium citrate) was used as a control.

Each ejaculate was divided and diluted at the rate of 1 : 20 or 1 : 50 (according to the quality of the semen when examined microscopically immediately after collection) so as to provide equal quantities from each diluent.

Table XXI

Diluent	Number of first services	Conception rates %
Yolk citrate and sulphanilamide	1,583	62·3
Yolk citrate	1,786	61·5

The difference of 0·8 per cent. as shown in Table XXI cannot be regarded as significant and the trial indicates that the addition of sulphanilamide to the usual citrate diluent does not cause any significant difference in the fertilising capacity of semen. No difference was observed after storage for two days; insufficient inseminations were carried out on the third day to allow the drawing of any conclusion.

It is possible that if the semen were heavily contaminated with bacteria as a result of faulty technique or from an infection in the male genitalia, the addition of sulphanilamide might improve its fertilising capacity. However, under such circumstances, the use of sulphanilamide or any antibiotic cannot be recommended, as it is imperative that the initial cause of the contamination should be removed.

Summary

1. The rapid increase in the number of cows inseminated per year indicates that artificial insemination is a satisfactory method of breeding cattle.

2. Although the conception rates obtained are satisfactory when compared with natural mating, there is need for much investigation in this field owing to the apparently inexplicable reductions in fertility that do occur.

3. There is no apparent breed difference among the bulls used at the Reading centre so far as fertility is concerned.

4. The interchange of semen between artificial insemination centres is a practical procedure, as judged by the conception rates thus obtained.

5. An attempt has been made to show the relationship between the estimated conception rate and actual pregnancies.

6. Good results were obtained by using semen of high quality diluted 1 : 50.

7. Variations are shown in the fertilising capacity of semen after storage. Evidence is presented indicating that the difference between bulls of high and moderate fertility becomes apparent when stored semen is used.

8. Inseminations carried out within the range of times recommended by artificial insemination centres should give satisfactory results.

9. It has been shown that at this centre the addition of sulphanilamide to semen diluents does not increase the fertilising capacity of the semen.

Acknowledgments are due to the many people who assisted in the work of the centre in various ways and in particular to the staff of the Centre.

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LEPTOSPIROSIS

Clinical Appearance of the Dog with Disease Caused by *Leptospira canicola* with Brief Reference to Diagnosis

BY

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Recent Literature

In the writer's opinion, publications on this subject which have appeared in *The Veterinary Record* during the past three years, taken collectively, do not give a clear description of the clinical appearance of the affected dog.

An abstract of an article by Randall[1] on the disease in the U.S.A. makes no differentiation between the syndromes caused by *L. canicola* and *L. icterohaemorrhagiae*, does not even mention nephritis, and is misleading in other respects if taken as a guide to the condition as now recognised in this country.

Joshua and Freak[2] describe six cases, serologically positive to *L. canicola*, but state, however, that their communication "does not purport to describe in detail the syndrome produced by *L. canicola*, but solely to discuss the use of penicillin."

Mills[3] reviews the literature and describes a general clinical picture of eleven cases classed as acute or subacute *leptospirae* infections, seven of these being attributable to *L. canicola*, and states that "diversity of symptoms is outstanding in this disease."

In 1949 McIntyre and Stuart[4, 5] record their finding on examination of a very large series of dogs, 140 of which showed serological evidence of current or past infection with *L. canicola*, and relate over 80 per cent. of renal disease in dogs in such infection. While other people had picked up this disease sporadically on the clinical side, McIntyre

and Stuart's contribution is excellent in elucidating this problem both from the scientific and clinical points of view, and converting speculation into certainty. They classify the stages of the disease as follows:—

1. *Invasive* organisms in blood stream.

2. *Primary renal* organisms concentrated in kidney; visible by dark-ground microscopic examination of the urine in over 50 per cent. of cases; blood urea abnormally high, and may lessen with penicillin treatment; serum agglutination titre to *L. canicola*, at least 1 : 10,000 (Schuffner's method), or even more significant, a distinct rise of titre shown on examination of two samples taken with one week's interval; commonest in young dogs from under six months to one year, and rare over three years.

3. *Secondary renal* chronic interstitial nephritis; organism not present in urine; blood urea abnormally high and does not lessen with penicillin treatment; titre 1 : 30 to 1 : 3,000 and second sample shows no rise; commonest between one and two years, not rare over three years.

The clinical features of illness are listed under the above headings, but the authors do not emphasise that in the two renal stages these are essentially similar, and that the grouping of cases as Primary or Secondary is carried out on other evidence. With reference to examination of urine for protein in these stages it is stated that, while the amount is usually small in mild cases, it is none the less definite.

Miss Joshua[6] mentions a large series of cases, but in describing the syndrome and methods of diagnosis she does not emphasise that thirst for water is often a leading sign, or stress the importance of diagnosing the very mild primary cases which of all types will respond best to treatment.

Discussion on Classification

In the present communication the signs of *L. icterohaemorrhagiae* infection are ignored, apart from mention that on occasion they can be clinically indistinguishable from those of infection by *L. canicola*, and the condition appears to be comparatively rare in house dogs in Glasgow. In describing the syndrome of *L. canicola* infection as met with in this clinic, the nomenclature mentioned above is adopted. The invasive stage undoubtedly occurs, but few attempts at diagnosis by blood culture were made and none was successful.

Primary and secondary renal stages were differentiated mainly by the agglutination test, as dark-ground examination of urine and blood-urea estimations were not done on all cases.

In old dogs chronic nephritis was usually readily distinguishable from the primary renal stage by a history of long-standing illness, and serological examination was unnecessary, except as a matter of interest. In younger dogs in the secondary renal stage, however, the history given by the owner was often misleading in that it tended to be one of recent onset of illness, and for prognosis and rational treatment, differentiation from the primary stage had to be made by microscopic and serological methods.

Clinical Signs

In the writer's opinion, dogs in the primary and secondary renal stages, irrespective of age when examined "on the table," were clinically indistinguishable—with the exception of the rare primary case which had a palpably enlarged kidney and the secondary case with an obviously diseased heart as evidence of long-standing nephritis. The signs observed can be described best by referring to a syndrome already familiar to practitioners, that of chronic nephritis in the old dog. This condition in many cases is the result of previous *L. canicola* infection. Very mild cases show little departure from normal, apart from thirst and loss of weight; more severe cases show these symptoms, also in variable degree the signs present in very serious cases—marked depression, wasting, marked or complete inappetence, frequent vomiting, polyuria, anaemia, "uraemic" odour in the breath, mouth abnormalities, and a pulse much more readily appreciated than normally, except just before death. Such signs were found in both primary and secondary cases, but while administration of penicillin to not too severe cases of the former produced a definite improvement, little benefit was noticed when it was given to the latter cases, which continued their downhill course. While wide variations in severity and course of the disease occurred, the syndrome of any individual case fell within the bounds of the above general description of nephritis.

Mouth abnormalities did not occur in mild cases, but 14 moderately or severely affected dogs out of 43 primary cases showed a brown discoloration of the tongue, a condition that was unusual in conditions other than nephritis. Mouth ulceration and coating of the teeth with a brown film of altered blood occurred in some cases, but the syndrome was not considered of diagnostic significance, as such changes were found in conditions other than leptospirosis.

In 12 of these 43 cases a temperature of 103° F. or more was recorded, but this was not a significantly higher proportion than found in secondary cases. Catarrh of eyes and nose was most unusual, congestion of conjunctivae and a sunken appearance of the eyeball were fairly common, and diarrhoea occurred in about 20 per cent. of cases, possibly due to excessive water intake. The latter is mentioned not for its importance, but in case it should be assumed that cases showing this feature should not be suspected of leptospirosis.

Primary cases of leptospirosis were apt to be missed if cases of slight indefinite symptoms in young dogs, and if dogs more severely ill, but not showing any typical train of symptoms, were not considered as suspected cases of leptospirosis. Mr. McIntyre, of Edinburgh, stressed the frequent occurrence of albumen in the urine of such cases and the importance of reaching an early diagnosis in the primary renal stage. To ensure this the writer has made a practice of catheterising and carrying out examination of urine for albumen in all suspected cases.

A "ring" salicyl-sulphonic-acid test was carried out. The absence of albumen was sufficient to rule out the presence of leptospirosis in most cases and its presence was an indication for carrying out further examination, either dark ground examination of urine or agglutination test. The former, as McIntyre points out, can be carried out by anyone with a good microscope which can be fitted with the necessary dark ground apparatus and the latter has to be carried out at a laboratory. Nine of these cases were diagnosed at once by dark ground technique, motile leptospirae being shown in the urine quite readily.

In the 43 primary cases serological tests were used in confirmation. Usually the first blood sample showed a titre* sufficiently high, 1 : 10,000 or more, to render a second sample unnecessary.

In a few primary cases and in secondary cases, when there was not a long history of illness, two blood samples with one week's interval were necessary for differential diagnosis.

* Schuffner's method of agglutination test was used.

SUMMARY

1. The writer discusses publications that have appeared in *The Veterinary Record* in the last three years on the clinical aspects of *L. canicola* infection in dogs.

2. He describes the syndrome of *L. canicola* as he has encountered it in a small-animal clinic in Glasgow.

3. The view is expressed that the main clinical features seen in a dog with current infection are those already familiar to practitioners as the syndrome of chronic nephritis in the old dog.

4. The importance of early diagnosis in mild cases is emphasised and it is suggested that routine urine testing for protein in young dogs showing indefinite signs would achieve this object. The negative test for albumen would negative the presence of the renal stages of leptospirosis and a positive would be an indication for further examination by dark ground method or by examination of blood samples with the agglutination test.

Acknowledgments.—My thanks are due to Dr. R. D. Stuart and Mr. W. I. McIntyre for assistance, often given under great pressure of work, particularly with the diagnosis service. I also wish to acknowledge help from my colleagues in the Clinical and Pathology Departments of the University of Glasgow Veterinary School.

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THE SEAWEED INDUSTRY

The Scottish Seaweed Research Association, whose address is the Institute of Seaweed Research, Inveresk Gate, Musselburgh, Midlothian, was founded in 1944 to determine "whether the possibility existed of creating a stable Scottish seaweed industry which would compete with those of other countries."

A survey of work done states that the chemical division, under the direction of Dr. W. A. P. Black, has now completed the analysis of all the common types of brown Scottish seaweed collected at monthly intervals over the last four years. As an outcome of this thorough and detailed investigation (which has had no counterpart anywhere else in the world) it is now possible to assess accurately the quantities of the unusual chemicals found in seaweed, the principal of which are the carbohydrates alginic acid, mannitol, laminarin and fucoidin, together with the algal proteins and the mineral constituents.

Since the end of the old kelp industry that produced iodine by very crude methods after burning the bulk of the weed, only one seaweed chemical, alginic acid, has been exploited commercially to any extent. Although this development has been successful and is expanding, the economics of the industry will obviously be enhanced if other constituents can be exploited. The Association's staff have recently concentrated their efforts on mannitol and laminarin, two hitherto unexploited seaweed chemicals, and methods have been completed on a laboratory scale for the production of these chemicals in reasonably high yield. When the Association's new semi-technical laboratory is ready in the autumn these methods will be taken to the pilot scale to provide industry with samples so that their commercial value may be assessed, and the economics of production determined.

Concurrent with this work, investigations have been carried out at the Institute, and at Edinburgh and Cambridge Universities, to find outlets for those chemicals. Evidence already available indicates that they may be used in the production of synthetic resins, explosives, plasticisers and glucose. Provided it is possible to harvest seaweed commercially, interested industrialists should have adequate supplies of these two chemicals which are potentially available in quantities exceeding 200,000 tons per annum.

QUESTIONS AND ANSWERS

The submission of questions for inclusion in this column will be welcomed: they can relate to any aspect of veterinary work. For purposes of record, each question is numbered, and those submitting questions are required to furnish (not for publication) name and address.

Answers to readers' queries represent exclusively the personal opinions of the writers, and criticism of the replies will be appreciated.

All communications should be addressed to the Editor.

A Hunter Mare—Enquiry as to Diagnosis

Q. 358.—*I examined recently, a light-weight three-quarter bred hunter mare and she exhibited the following symptoms:—*

This mare was quiet to handle in the stable. I examined her mouth and rasped her teeth and apart from a certain amount of thickening at the points of contact of the bit on the rami and that the slight swelling on the right side was somewhat more prominent and more tender, there was no gross lesion present. The right masseter muscle was less toneful than the left and when pressed firmly caused pain and flinching.

When ridden she was sound of wind and a very fast mover, but after going, say, a couple of hundred yards, she began pulling her head round to the left and kept it there. Her right ear then dropped forward and the tongue lolled out of her mouth and she conveyed the impression that the whole of the right side of her face had gone quite dead; in this state she becomes practically unmanageable, and is pulled up with the greatest difficulty. She has been known to gallop a couple of miles, during which time she continues to show the aforementioned symptoms to a varying degree. A rubber-lined bar bit is used but a snaffle does not make any difference.

Apart from the tenderness in the right masseter muscle and the small lesion on the rami, I found nothing abnormal, except perhaps rather more space between the larynx and the first ring of the trachea than one usually finds.

I should be grateful to have the opinion of any of my colleagues who perhaps have had a similar case or who can suggest what physiological abnormality is taking place and a possible remedy.

A.—The nerve which is affected primarily is the fifth cranial and it is stimulation of the sensory part of this nerve which stimulates the reflex action of the seventh and twelfth and also in the neck muscles probably *via* the eleventh, a spinal accessory. It may be that the peripheral irritation on the tender bars of the mouth is sufficient to initiate the reflex, but it is more probable that the initial irritated spot is near the petrous temporal and adjacent base of skull: the sensory ganglion of the fifth is near this spot. It may be that there has been some accidental injury to this part. It looks as if one would find the result of this damage in the blood vessels in this region and that when the horse is exercised and the blood pressure is stepped up an unusual pressure and irritation in consequence occurs in the region of the Gasserian ganglion.

. . . . .

Tail Slackness in Cattle

Q. 359.—*I encounter commonly a condition in cattle in this district which is known locally as "tail-chock"—the symptom used by the layman for the diagnosis of such condition being an apparent slackness in a certain part of the tail, which allows the tail to be twisted in all directions; often there is also a loosening of the teeth.*

It is most commonly encountered in beef cattle kept during the winter on straw and hay and would apparently be a mineral deficiency.

I would be very grateful for any information as to the exact nature of the complaint and any preventative or curative treatment.

A.—This condition is due to a calcium deficiency, and may be remedied by feeding steamed bone flour at the rate of 5 per cent.

Condition in Pigs for Diagnosis

Q. 360.—*I was called in to see a four-months-old gilt, running in a pen with four other pigs. She was showing the following: Temperature* 109° *F.; purple patches (not raised or diamond shaped) behind both ears, along the back and on both sides of the tail; slight staggering. She was off food for six days. There was no vomiting, diarrhoea, coughing or running eyes but breathing was fast.*

I injected 3 *c.c. oily penicillin on two consecutive days; after the second injection I gave "M & B* 693." *With no improvement in evidence the animal died when being dosed on the fifth day.* Post-mortem *examination was completely negative apart from the skin lesions.*

A pig from the same sty developed a similar rash, and high temperature and recovered on early penicillin therapy.

Could a possible cause for this unusual condition be suggested?

A.—The history of this case suggests that the cause of this condition was an infection and bacteriological examination might have established the causative organism. In the respondent's experience a large percentage of cases of this type are due to swine erysipelas infection, but undoubtedly there are other infections which can cause this trend of symptoms and on which research is greatly needed. The recovery of the second pig with early penicillin therapy tends to confirm the opinion expressed above. Whilst penicillin is very effective in most cases of swine erysipelas, in the respondent's opinion there is a tendency to under-dose and one should not hesitate to give half a million units every 24 hours if the response to the initial dose is not immediate.

. . . . .

Mummification of Foetuses in the Bitch

Q. 361.—*Two pekinese bitches recently whelped at the same kennels. Both had had normal litters previously. The first had a premature litter, all dead; four pups were almost full term, but one was mummified. The other was three days late, had five live pups and one mummified.*

In each case the mummified foetus was the fourth delivered and had developed to three to four weeks. The bitches are unrelated but the stud dogs are distantly related. Can you give the cause of mummification?

A.—The causes of mummification of foetuses occurring in a litter, the other members of which reach full term, have not been clearly worked out.

It seems likely that a number of factors may play a part in different cases. Among the causes of foetal death may be:—

(1) Malnutrition due to:

(*a*) Defects in maternal endometrium and insufficient blood supply;

(*b*) Accidental deprivation of blood supply by trauma;

(*c*) Specific deficiency in maternal diet, *e.g.*, vitamin E, or general malnutrition of bitch;

(*d*) Overcrowding in a large litter.

(2) Toxaemia, present in the bitch, due to infective or other causes without necessarily local infection *in utero*.

(3) Inherited reduced foetal viability.

In the majority of cases seen by the writer there has been either bad kennel hygiene and feeding, old age on the part of the bitch, or a history of past illness in the kennels, *e.g.*, hard pad disease. In a number of cases beta haemolytic streptococcal infection has been found in vaginal swabs but not in swabs from placental areas of uterus (taken *post-mortem* or at caesarean) or in the dead foetus.

It would appear well worth while to investigate the possibilities of sub-clinical hard pad disease, in which case the trouble may right itself after adequate rest and convalescence, and also to take swabs for *Beta haemolytic streptococcus* infection. If positive, give penicillin at the time of mating, at mid-term and at whelping. Diet and hygiene should of course be corrected if deficient in any way.

ABSTRACTS

[Results of Tests of Newer Penicillin Preparations and of Treatment of Staphylococcal Infections of the Bovine Udder with Penicillin. MURNANE, D. (1949.) *Aust. vet. J.* **25.** 85.]

Murnane has undertaken studies on various types of penicillin preparations for the treatment of infections of the bovine udder. It was shown that suspensions of penicillin in oil produced levels in the udder equal to those produced by infusions of similar doses in aqueous solution. He draws attention to all the well-known advantages of the now almost universally used collapsible mastitis tubes.

There was no significant difference in persistency as between the same doses of calcium penicillin and crystalline penicillin G. The addition of beeswax to penicillin suspension in concentrations up to 6 per cent. did not appear to prolong the penicillin level in milk. An assessment was also made of the so-called "Mastics" (soluble bougies). These gave results comparable to those obtained with aqueous penicillin, the dose in each being 25,000 units.

Procaine penicillin in doses of 20,000 units was also studied and compared with suspensions of calcium penicillin. The procaine salt gave higher udder levels. Unfortunately, the results are vitiated by the fact that assays of milk levels were not continued for longer than 24 hours after infusion.

Finally, some experimental treatments were undertaken in staphylococcal mastitis. Large doses of penicillin, 100,000 or 250,000 units on three successive days, failed to eliminate these organisms from 16 out of 19 quarters. Sulphone (4 : 4′ diaminodiphenyl sulphone) gave even less effective results. A mixture of sulphone and penicillin was rather more effective than sulphone alone, although infections persisted in 14 out of the 19 quarters treated.

D. L. H.

* * * * *

[Contribution to Proceedings of the Second Commonwealth Health and Tuberculosis Conference: National Association for the Prevention of Tuberculosis. FRANCIS, J. (1949.)]

The author, in his contribution to this Conference, recapitulates briefly some of the known facts about tuberculosis in the bovine, and points out that it was not until the problem was tackled by means of the tuberculin test that reasonably rapid progress in eradication was made.

He reiterates the view that the incidence of tuberculous cattle has never been as high as 40 per cent. This figure of 40 per cent. probably applied only to old cows. He feels that Ritchie's estimate of 18 to 20 per cent. infected animals is much nearer the true incidence in the total cattle population of Great Britain.

It is pointed out that Denmark had an incidence as great as the British one, and by 1948 the cattle population was free of tuberculosis. The progress made with attestation in this country is encouraging and there appears to be no reason to think that our experience will be less successful than the Danish.

Francis considers that, although bovine tuberculosis gives rise to some tuberculosis in children, the complete elimination of tuberculosis in bovines will probably make only a very slight contribution to the total reduction of tuberculosis in man. In fact, the eradication of tuberculosis in cattle

should be done for its own sake, for economic reasons, with the intention of getting a greater efficiency of milk production. The author obviously feels that it is a mistake to attack tuberculosis in cattle on the grounds of public health. Pasteurisation of milk does not protect country dwellers from direct respiratory infection between man and cow, for Scandinavian evidence has shown that in country districts 50 per cent. of the cases of pulmonary tuberculosis in man may be of the bovine type.

Finally, the author criticises the present negative attitude to human tuberculosis in this country and feels that far more active steps are necessary to prevent infection of man; he considers that B.C.G. vaccination has been greatly neglected in the country and he stresses that a positive medical approach on similar lines to the veterinary approach might greatly reduce the ravages of this disease in man.

D. L. H.

REVIEW

[Walters' Horse Keeper's Encyclopedia. By Andrew George Elliott. Right Way Books, Glade House, Kingswood, Surrey. Pp. 194. Price 5s.]

The novice, who has just bought his first horse, will find this little book invaluable. It is easy to read and to understand. The author has attempted, in the space of 200 pages, to set down all that need be known to keep a horse in good working shape. If he has attempted the impossible, he has all but achieved it. The advice given is sound and to the point. There is a nice balance between the methods of more spacious days and the austerity of to-day.

The latter part of the book is devoted to the diagnosis and treatment of disease. Here the veterinary surgeon is tempted to be critical. The medicine chest still smells strongly of iodine and the seat of spavin has wandered a little from the conventional spot, but the novice will not go far wrong if he uses this book as his guide.

The veterinary surgeon himself, will learn little from the book. He can recommend it with confidence to those clients who want a good book on how to keep a horse.

LEGAL NOTES

Horse Injured: £309 *Damages*.—At Durham Assizes, William Darling, a farmer and horse dealer, of Sacriston, was awarded £309 damages against the Attorney General and Messrs. J. Raeburn & Sons, Ltd., public works contractors of Airdrie, Lanarkshire, in respect of injuries to a horse. Darling explained that he bought the horse (a black gelding) for £225, hoping to sell it later at a profit as a hunter or possibly as a steeple-chaser. In 1947 he received notice that the Ministry of Works was to prospect on his land for coal. The contractors had fenced round part of a field and a heap of timber had been left near the fence. Darling said seven of his horses were galloping round the field one night when the black gelding and another horse fell over the timber. The gelding did not recover from its injuries and had to be sold for £20. He claimed that both defendants had been negligent. Darling claimed for the cost of the horse, the cost of its keep after injury and for the cost of veterinary surgeon's fees.

* * * * *

Weekly Wisdom

A month in which a Minister of the Crown has described a small relaxation of his regulating powers as "an experiment in freedom" cannot be an inappropriate time to ask the House of Lords to consider how liberty stands to-day.—The Times (June 30th).

VICTORIA VETERINARY BENEVOLENT FUND

ANNUAL GENERAL MEETING IN LONDON

The thirty-second annual general meeting of the Members of the Victoria Veterinary Benevolent Fund was held at No. 10, Red Lion Square, London, W.C.1, on Wednesday, June 7th, 1950.

The chair was taken by the President (Mr. Arnold Spicer) at 2.30 p.m.

(Owing to the fact that by the Articles of Association of the Fund the annual general meeting has to be held on the same day as the annual general meeting of the Royal College of Veterinary Surgeons, the attendance of Council Members and others was very small. This was due to their attendance at the R.C.V.S. meetings held this year in Dublin.)

The notice convening the meeting, having been published in *The Veterinary Record*, was taken as read.

Minutes.—The minutes of the previous annual general meeting, which had been printed in *The Veterinary Record*, were taken as read and signed as correct.

Election of Officers

President.—Lieut.-Colonel P. J. Simpson was elected President for the ensuing year, Mr. Arnold Spicer having tendered his resignation which was accepted with great regret.

Vice-Presidents.—The four Vice-Presidents, namely, Professor J. B. Buxton, Messrs. H. W. Dawes, G. P. Male and Professor G. H. Wooldridge, were re-elected.

Honorary Secretary.—Mr. Arnold Spicer was elected Hon. Secretary for the ensuing year, vice Lieut.-Colonel P. J. Simpson, who had been elected President.

Honorary Treasurer.—Professor J. B. Buxton was re-elected Hon. Treasurer for the ensuing year.

Auditors.—Messrs. Wilkinson, Chater & Co. were re-appointed Auditors for the ensuing year.

Annual Report and Statement of Accounts

The Annual Report and Statement of Accounts, as presented, were received and adopted.

Election of Council

The following were re-elected to the Council as representing Members of the Fund: Messrs. J. Holroyd, H. W. Steele-Bodger, Professor T. G. Browne, Mrs. D. I. Glover, Mr. G. N. Gould, Captain J. W. Procter, Mrs. E. Wooldridge, Dr. W. R. Wooldridge, Captain A. Whicher (Mrs. G. N. Gould resigned her seat on the Council).

Vote of Thanks.—There being no other general business, the meeting terminated with a vote of thanks to the retiring President, Mr. Arnold Spicer, for his work not only in the past year but during the five years that he occupied the Presidential chair.

DAMAGE BY PESTS

The Prevention of Damage by Pests Act, 1949, which came into force on March 31st, 1950, makes new permanent provision in Great Britain for the control of rats and mice and for the prevention of damage to food by rats, mice, insects or mites. Local authorities are made responsible for seeing that their districts are kept as free as possible from rats and mice, and they are given power to require owners or occupiers who are not keeping their land or premises free to take action to destroy rats and mice or to prevent the intrusion of rats and mice into premises. The Act also requires persons dealing with food and food containers to notify any risk of substantial damage on account of infestation by rats, mice, insects or mites. Inspectors, chemists and entomologists have been appointed for various areas of the country.

QUESTIONS IN PARLIAMENT

Bovine Tuberculosis (Eradication)

Mr. James Johnson (June 29th) asked the Minister of Ariculture if he is yet in a position to say what are to be the financial arrangements of the scheme for eradication of bovine tuberculosis which is due to begin on October 1st next.

Mr. G. Brown: Yes, Sir, I am glad to say that agreement has been reached with representatives of the National Farmers' Unions and Milk Marketing Boards in Great Britain on the basis of a plan for eradicating bovine tuberculosis by areas and on the necessary revision of the Tuberculosis (Attested Herds) Scheme which, as my right hon. Friend has already announced, will come into operation on October 1st, 1950. With permission I will circulate a statement giving details of this plan in the Official Report.

Following is the statement:—

Our general objective is to stimulate progress in the voluntary eradication of tuberculosis from herds in all parts of the country, and to eliminate tuberculosis entirely from selected areas as they become ripe for such treatment. Since 1944 owners of attested herds have received only the T.T. quality premium of 4d. per gallon of milk sold (if they held a T.T. licence) and there has been no payment for beef or rearing herds.

Under the new arrangements, which are to operate from October 1st next, there will be:—

(1) An attestation bonus as a contribution towards the cost of eradicating tuberculosis from the herd. This will be at the rate of 2d. per gallon of milk sold for four years, and 1d. per gallon for a further two years or, at the option of the farmer at £2 per head of cattle for four years and £1 per head for two more years.

(2) A continuing quality premium on T.T. milk in recognition of its superior hygienic quality at a minimum of 2d. per gallon from October 1st next until March 31st, 1954. The minimum rates in each subsequent period of two years will be settled biennially from 1952 onwards, any adjustments upwards or downwards in the guaranteed minimum being made in the light of circumstances. The actual rates will be subject to negotiation at the annual February reviews for 1951.

In addition to the above payments the owner of an attested herd in which reactors occur after the end of the fourth year will, provided that he has complied with the rules of the Scheme, be paid compensation in respect of those reactors. A revised Attested Herds Scheme embodying the above bonus proposals will be made at an early date to come into operation on October 1st next.

The general outline of the area eradication part of the plan, as agreed with producers' representatives, is fairly well known. Some details of the way in which it is to work, and of the areas first to be selected as free-testing and eradication areas are, however, still under discussion, but I hope to make a further announcement in due course. This part of the plan will also come into operation in October. The estimated additional cost of the new proposals as compared with the present arrangements is about £½ million in 1950-51 and just over £1 million in 1951-52.

Rapid progress has been made during the past few years in the eradication of tuberculosis from dairy herds. I feel confident that these proposals will ensure the continuation of that progress and also provide a new stimulus for the owners of other herds, thereby laying the foundation for the final eradication of bovine tuberculosis from Great Britain within a measurable time.

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Calf Rearing Subsidy

Mr. Slater (June 29th) asked the Minister of Agriculture whether he will announce the rates of subsidy under the calf rearing scheme on calves born after the end of next September.

Mr. G. Brown: My right hon. Friend and my right hon. Friend the Secretary of State for Scotland propose, subject to securing the necessary Parliamentary approval, to make an Order under Section 1 (4) of the Agriculture (Miscellaneous Provisions) Act, 1949, fixing a rate of £5 per head for steer calves born after September 30th, 1950, and before October 1st, 1951. It is not proposed to pay subsidy on heifer calves born after September 30th, 1950.

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Calves (Ear Marking)

Mr. H. L. D'A. Hopkinson (June 29th) asked the Minister of Agriculture what representations he has received from the National Farmers' Union in regard to the possibility of modifying the size of the punch used for marking the ears of calves on which subsidy is paid.

Mr. G. Brown: The National Farmers' Union have made representations of a general nature to the Department on this subject, but they appreciate the difficulty of finding any satisfactory alternative to the present system.

Mr. Hopkinson: Is it not a fact that the National Farmers' Union are not satisfied with the present position, and that they would like it modified on one of the lines indicated by the Minister in reply to my hon. Friend the Member for Westmorland (Mr. Vane) a few weeks ago?

Mr. Brown: It is a fact that the N.F.U., like the rest of us, would like to find some other way of doing it, but they recognise, as we do, that there are objections to every alternative method yet suggested.

Mr. Vane: Is the hon. Gentleman aware that a number of calves' ears have been badly damaged by the use of a punch which makes a hole half an inch in diameter? Is he aware that many farmers think that if a punch making a hole ⅜ inch in diameter or a triangle with a ⅜ inch side were used by experienced men the disadvantages found earlier would be removed and that this would be well worth trying?

Mr. Brown: I would remind the hon. Gentleman that as guardians of the taxpayers' purse we have to be careful that the hole will not afterwards be lost or covered. No alternative method has yet been suggested which is not open to that very serious objection.

Colonel Gomme-Duncan: As pedigree cattle are already marked on the ear with a number, is it not unnecessary to have a large hole as well?

Mr. Brown: The hon. and gallant Gentleman has hit on the great difficulty. The existence of private marks makes it difficult to adopt a small one of our own.

Mr. Hurd: Will the hon. Gentleman have experiments made on the lines suggested by my hon. Friend the Member for Westmorland (Mr. Vane)—a small triangular mark?

Mr. Brown: I cannot undertake to have experiments made, but I am quite willing to consider any alternative suggestions which are made to us.

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Gambia (Poultry Scheme)

Mr. Hurd (June 21st) asked the Secretary of State for the Colonies if he has now received information about the import of maize and other feeding-stuffs into Gambia; and what request for these supplies was made by the Colonial Development Corporation owing to the poor yield of crops on land planted under the Corporation's poultry project scheme.

Mr. Dugdale: There were no imports of maize into the Gambia during the past 12 months. Imports of other feeding-stuffs, mainly corn, were 511 tons, valued at £14,600. As regards the second part of the Question, it is not the practice to give figures relating to individual importers, but I understand that a proportion of these supplies were on account of the Colonial Development Corporation.

Mr. Hurd: May we take it that our £800,000 poultry farm in the Gambia will very soon be on a self-supporting basis?

Mr. Dugdale: Yes, Sir, I hope so.

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Flour Improver

Dr. Barnett Stross (June 19th) asked the Minister of Food how soon will all flour which is treated by some form of improver be so treated that the agene process can be forbidden; and whether he will estimate the cost in dollars for machinery and chlorine dioxide, which must be imported from the United States of America.

Mr. Webb: It will take about two years to complete this change. The dollar cost will probably be about 337,000 United States dollars.

Dr. Stross: Is my right hon. Friend aware that there is a considerable body of medical opinion that believes that peptic ulceration is aggravated by the agene process and that this has been responsible for the increase of duodenal and gastric ulcers within recent years? Will he give us an assurance that as soon as possible we shall be free from this somewhat poisonous improver?

Mr. Webb: Two years is the period.

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Sheep, Islington (Condemnation)

Mr. Thornton-Kemsley (June 21st) asked the Minister of Food what was the total number and weight of sheep slaughtered at the Metropolitan Cattle Market, Islington, on June 3rd, 1950; what percentage was subsequently condemned; and what was the consequent loss to his Department.

Mr. Webb: Five hundred and eleven sheep, weighing about 23 tons, were slaughtered at the Metropolitan Cattle Market, Islington, on June 3rd, and despite all the normal precautions about 50 per cent. by weight had to be condemned as result of the hot weather over the week-end. The exact cost of the condemnations to my

Department will not be known until our records have been examined in detail, and this will take some little time.

Mr. Thornton-Kemsley: When the Minister talks about the very hot weather over the week-end, are not records available to him of exactly the same thing happening over mutton in the time of his precedessor at this slaughterhouse last summer. Has not the trade made representations that there ought not to be slaughtering at this slaughterhouse at Saturday or on Friday, because of the lack of cold storage accommodation, which, in this case, was full before slaughtering commenced ?

Mr. Webb: I am aware of the shortage of refrigerating capacity in this slaughterhouse, but we are limited by capital investment considerations. We are doing our best to put it right and I think that by next year we shall have adequate accommodation.

Mr. Thornton-Kemsley: Is the Minister limited by capital investment considerations from slaughtering sheep on days of the week other than Friday and Saturday ?

Colonel Gomme-Duncan: Is any disciplinary action to be taken against the officials concerned for this second occasion on which wicked waste has taken place ?

Mr. Webb: I am waiting for a report on the whole situation.

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Ducks (Blood Testing)

Mr. Crouch (June 22nd) asked the Minister of Agriculure if, in view of his recent research into the Salmonella duck disease, he will reintroduce at an early date the blood testing scheme which was discontinued during the war.

Mr. T. Williams: No, Sir. The blood testing of ducks was abandoned because the results obtained therefrom were unreliable. Other methods of diagnosis are being studied but none suitable for general application has yet been found.

Mr. Crouch: Is the Minister aware that organised duck keepers are most anxious to improve the health of the ducks in this country ?

NOTES AND NEWS

Diary of Events

July 12th.—Meeting of the Editorial Executive Committee, N.V.M.A., 2.30 p.m.

July 12th and 13th.—Annual General Meeting of the Association of Veterinary Teachers and Research Workers (Northern Region), at Aberystwyth (Veterinary Department, Agricultural Building, Alexandra Road).

July 21st.—Meeting of the Association of Veterinary Teachers and Research Workers (Southern Region), at the Royal Veterinary College, Camden Town, N.W.1, 2 p.m.

July 21st.—Summer Meeting of the Royal Counties Division, N.V.M.A., at Whipsnade Park Zoo, 11.15 a.m.

Aug. 3rd.—Special Meeting of Technical Development Committee, N.V.M.A. to discuss report on Artificial Insemination, at 36, Gordon Square, London, W.C.1, 11 a.m.

Sept. 3rd-8th.—Sixty-eighth Annual Meeting and Congress of the National Veterinary Medical Association, at Cardiff.

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N.V.M.A. Council and Committee Meetings

The next Council and Committee meetings of the Association will be held in London on July 12th, 13th and 14th.
The time-table is as follows:—

Wednesday, July 12th, at 36, Gordon Square, W.C.1.

11 a.m. Organising Committee.
2.15 p.m. Veterinary State Medicine Committee.

Thursday, July 13th, at 36, Gordon Square, W.C.1.

10 a.m. Parliamentary and Public Relations Committee.
11.30 a.m. Home Appointments Committee.
2.30 p.m. General Purposes and Finance Committee.

Friday, July 14th, at Connaught Rooms, Great Queen St., W.C.2.

11 a.m. **Council Meeting.**

PERSONAL

Births.—Cruickshanks.—On June 6th, 1950, to Joyce (*née* Fielding), wife of John Cruickshanks, B.Sc., M.R.C.V.S., Blandford, Dorset, a son.

Daniel.—On July 3rd, 1950, at Orlesmead, Wilton, Ross-on-Wye, to Brenda (*née* Rust) and Walter Daniel, M.S.R.C.V.S., a sister for Bruce and Hugh—Heather Elizabeth.

Peters.—On June 30th, 1950, at Ryde, I.O.W., to Enid (Judy), wife of E. Gerald Peters, M.R.C.V.S., a daughter—Linda Jane.

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Marriage.—Ogden—Ibbetson.—The marriage of Laurence Ogden, M.R.C.V.S., of Upper Hill Barn, Aston Terrold, and Jill Ibbetson, M.R.C.V.S., daughter of Mr. and Mrs. T. H. Ibbetson, of Well Barn, Moulsford, Berks, took place at Wallingford on June 24th, 1950.

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Forthcoming Marriage.—Bowler—James.—The engagement is announced between Geoffrey T. Bowler, M.R.C.V.S., of Mears Ashby, Northamptonshire, and Miss Vivienne James, M.R.C.V.S., of Glastonbury, Somerset.

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Dr. W. M. Henderson in the U.S.A.—The Economic Co-operation Administration (Marshall Plan) Mission to the U.K. announces that Dr. W. M. Henderson, of the Foot-and-Mouth Disease Research Institute, Pirbright, Surrey, is in the United States for a two-and-a-half-month study of techniques for the control of animal virus diseases. The project is part of the E.C.A. technical assistance programme, designed to help Marshall Aid countries increase their agricultural and industrial production. Dr. Henderson will enquire into the work done at the University of Pennsylvania and at laboratories of the U.S. Department of Agriculture at Beltsville, Maryland. The United Kingdom has a well-developed foot-and-mouth disease control programme, and Britain's Foot-and-Mouth Disease Research Institute is working closely with the Joint Mexican-American Foot-and-Mouth Disease Commission. The United Nations Food and Agriculture Organisation has suggested that the Institute act as the centre for a special study of virus strains and their collection.

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Cornell Doctorate.—At the spring graduation ceremonies at Cornell University, Eric Wynn Jones, M.R.C.V.S., was admitted to the degree of Doctor of Philosophy. Work was carried out with the aid of the Miss Aleen Cust research scholarship and a Cornell University graduate fellowship.

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Mr. A. L. Walther, M.A. (Agric.), M.R.C.V.S., has recently resigned his position as Assistant to Dr. Blount on joining Messrs. Crosfields and Calthrop, Ltd., of Liverpool, in the capacity of Nutritional Adviser to the Company. Mr. Walther will be stationed at Liverpool.

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R.C.V.S. OBITUARY

Spooner-Hart, Robert, Capt. A.A.V.C., Clinton Street, Goulburn, New South Wales, Australia. Graduated London, March 27th, 1896. Died May 5th, 1950; aged 78 years.

Mr. Robert Spooner-Hart was born in India, where his father at one time held an important position as veterinary surgeon in Calcutta.

Deceased went to Australia in the early part of this century and served as an officer in the A.A.V.C. during the First World War. After returning from war service he settled in practice at Goulburn but retired from the practice some three years ago.

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DISEASES OF ANIMALS BILL

Consolidation Measure

The Diseases of Animals Bill, recently given a second reading, without discussion, in the House of Lords, consolidates the Diseases of Animals Acts, 1894 to 1937 (including various sections of the Agriculture Act, 1937) and certain other enactments relating to diseases of animals, including the Exportation of Horses Acts, 1914 and 1937, the Importation of Animals Acts, 1922 (session 2), the Importation of Pedigree Animals Act, 1925, Part I of the Animals Act, 1948, and sect. 2 of the Dogs Act, 1906. The Bill is divided into three Parts. Part I (sects. 1 to 51) deals with the powers of the Minister of Agriculture to make orders and to authorise local authorities to make regulations, eradication of diseases, powers of slaughter, import and export of animals, control of dogs and diseases

of poultry. Part II (sects. 52 to 56) regulates the manufacture of veterinary therapeutic substances. Part III contains general and supplemental provisions. The local authorities for the purposes of the intended Act are the borough councils where the population is at least 10,000 according to the 1881 census, and elsewhere the county and county borough councils. In London the county council is the authority for the administrative county except that the city corporation is the authority for the city of London and is in addition the county authority as regards imported animals. The intended Act is to come into operation on November 1st, 1950.

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The second edition has been published of M.R.C. Memorandum No. 21, "List of Species Maintained in the National Collection of Type Cultures" (H.M.S.O., 9d. net). In general the nomenclature follows that of "Principles of Bacteriology and Immunity" by Topley and Wilson (1946).

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IMPORTATION OF POULTRY CARCASES

The Ministry of Agriculture and Fisheries announce that an Order (the purpose of which is to minimise the risk of conveying fowl pest to British flocks) which comes into force on July 10th, 1950, requires poultry carcases imported into Great Britain from Belgium, France, Hungary and Poland to have attached to them metal discs bearing the name of the country from which they have been brought. Poultry from these countries, in addition to being so marked, must not be sold by retail, except in certain areas around London, Birmingham, Manchester, Liverpool, Cardiff, Swansea and Bristol. The limits of these areas are defined in the Order. The Order makes it illegal to sell poultry from which the metal discs have been removed or to remove such discs unless the removal is effected in the preparation of the carcase for cooking.

The importation of poultry carcases from Australia, New Zealand, Argentine, Canada, Uruguay, Southern Rhodesia, Northern Ireland, the Republic of Ireland, Norway, Sweden, Denmark and Holland is permissible, and there is no restriction on the sale of carcases from those countries.

No restrictions are placed on the importation or sale of carcases that have been fully cooked.

Copies of the Order which is entitled the "Poultry Carcases (Importation) Order, 1950," can be obtained from the Ministry of Agriculture and Fisheries, Animal Health Division, Hook Rise, Tolworth, Surbiton, Surrey.

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AMENDMENT OF THE MILK MARKETING SCHEME, 1933

The Minister of Agriculture and Fisheries has made an Order which provides, *inter alia*, for the appointment by the Minister of members of the Milk Marketing Board, the regulation of investment of the Board's funds and the establishment of a Disciplinary Committee to hear cases of alleged contravention of the Milk Marketing Scheme. The Order came into operation on July 1st, 1950. The names of the persons whom the Minister of Agriculture and Fisheries will appoint to the Milk Marketing Board in accordance with this Order will be announced shortly.

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ADDRESSES OF DISEASE-INFECTED PREMISES

The list given below indicates, first, the county in which are situated the premises on which disease has been confirmed, followed by the postal address and date of outbreak.

SWINE FEVER:

Aberdeen.—Mastrick Farm, Aberdeen City (July 1st).
Angus.—Lower Balmachy, Carnoustie, Angus (July 1st).
Clackmannan.—Barn Park, Tillicoultry, Clackmannan (June 28th).
Dorset.—The Grove, Dorchester, Dorset (June 29th); Red Cow Farm, St. George's Road, Fordington, Dorchester, Dorset (July 3rd).
Kincardine.—Rob Roy Inn, Parish of Kinneff, Kincardineshire (June 28th).
Midlothian.—Nazareth House, Lasswade, Midlothian (June 30th).
Somerset.—Folly Farm, Stoke Trister, Wincanton, Somerset (June 28th; Rookery Farm, Lottisham, Glastonbury, Somerset (June 29th); Lower Woolston Farm, North Cadbury, Yeovil, Somerset (June 30th).
Surrey.—Oxted Green, Milford, Godalming, Surrey (June 28th); Saracen's Farm, Saunders Lane, Mayford, Surrey (June 29th).

A.I. CENTRE AT YORK

With the object of promoting and improving the type, quality and production of dairy cattle, the Milk Marketing Board are extending their activities with artificial insemination, and it has been proposed to establish a centre at York. A site has been purchased for this purpose and the contract for the erection of the premises is now being examined.

The main centre will start to operate next spring, and sub-centres connecting up with the main centre will be established during the following summer and autumn. The centre will accommodate 30 bulls representing the main breeds of dairy cattle. It is also proposed to stand one or two beef bulls at the centre.

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RECOVERY IN LIGHT HORSE BREEDING

Under the above heading the special correspondent of *The Times* stated that the Hunters Improvement and Light Horse Society's show on the admirably appointed ground of the Shropshire and West Midlands Agricultural Society at Shrewsbury demonstrated the extraordinary recovery made in light horse breeding since the war.

"The premium stallion scheme has produced during the past year more than 1,000 youngsters of unexceptionable breeding, and these are the horses which will in the years to come make their mark as hunters, saddle horses, point-to-point winners, and mounts for our Olympic teams. It is seldom that one has the opportunity in England to see enough of this young stock to form a definite opinion, but here at Shrewsbury we have seen quality in quantity comparable with, and probably superior to, what one sees in Dublin, at Ballsbridge.

"The produce and young stock classes were superb: the riding classes, with a few exceptions, moderate. Of all these the finest and most important was that for brood mares 'up to 14 stone' which had produced a foal by a thoroughbred or registered hunter sire in 1950, and here it may be remarked that roughly 70 per cent. of the young stock entry was got by premium sires, including 13 prize winners and all the placed heavyweight brood mares."

CORRESPONDENCE

The views expressed in letters addressed to the Editor represent the personal opinions of the writer only and their publication does not imply endorsement by the N.V.M.A.

"AN IMPROVED TECHNIQUE IN RUMENOTOMY"

Sir,—Mr. J. McLintock, of Norwich, in an article published in *The Veterinary Record* of September 17th, 1949, described some instruments he had constructed to assist in the operation for rumenotomy. We had a set of these made by a local firm of metal workers, and have now had sufficient opportunity to use them and assess their value. We cannot too strongly emphasise their usefulness. They greatly simplify and shorten the operation, as well as overcoming the soiling of the wound, which can so easily occur, especially in the operation for impaction, when it is necessary to evacuate ruminal contents.

We should now be sorry to have to undertake a rumenotomy without the aid of these instruments, and our reasons for writing this letter are to draw attention to them again and to congratulate Mr. McLintock on his ingenuity.

Yours faithfully,
E. P. BARRETT.
H. A. CRAWSHAW.

28, Stoke Road, Guildford.

ADVERTISERS' ANNOUNCEMENTS

Hodgson & Walkley, Ltd., Brettenham House, Lancaster Place, Strand, London, W.C.2, invite applications for the free receipt of a small booklet entitled "The Sterilisation and Care of Hypodermic Syringes," which has been written with the object of assisting all who use hypodermic syringes to avoid the many pitfalls with which their employment is beset.

Prevention of Blackhead in Turkeys

The veterinary science division of Boots Research Department at Thurgarton, Notts, have recently announced that acetarsol will give 100 per cent. protection against blackhead infection in turkeys. This is supplied as solution-tablets containing 17½ grains of sodium salt under the brand name Turk-E-San; when dissolved in 2½ gallons of drinking-water, one tablet gives a 0·01 per cent. solution. Prophylaxis should be started not later than one month after hatching and the birds must not be allowed any other supply of drinking-water. Treatment is continued until seven days before killing.